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cal characteristics of husband and wife be due primarily to the tendency to marry within the same racial group, one might expect a large correlation for cephalic index. Instead we find the lowest correlation of the three determined.

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A GYNANDROMORPH IN *DROSOPHILA* *MELANOGASTER*¹

IN 1916 Hyde and Powell described a mosaic female with one eye eosin and the other blood. They interpreted this case in the light of Morgan's suggestion of 1914 that "Gynandromorphs and mosaics may arise through a mitotic dislocation of the sex chromosomes." In other words they believed one X chromosome carrying the gene for eosin went into the cells of one eye and the other X chromosome carrying the gene for blood went into the other eye. In 1919 Morgan and Bridges described a large number of gynandromorphs. The hypothesis of chromosomal elimination explains most of them, but a number of special cases are explained in other ways. One of their special cases was a male with one eye eosin and the other eosin vermilion. They explained this case by assuming that the egg had two nuclei, one of which after maturation had an eosin vermilion X chromosome and the other an eosin X chromosome. Further, they assumed each nucleus to have been fertilized by a Y sperm. These hypotheses would explain the facts that the individual was male throughout and that one eye was eosin vermilion and the other eosin.

In our experiments a somewhat similar mosaic appeared. The individual was male throughout, with one eye garnet and one white. The parentage was as follows: a garnet male was mated to a yellow white female. An F_1 wild-type daughter was mated to an F_1 yellow white male. From this pair of parents the mosaic arose. It was fertile and was bred to a garnet female. In F_1 all males and females were garnet. The F_1 garnet males and females were inbred. In F_2 the females were garnet but the males were garnet and white in approximately equal numbers (1,089 garnet to 1,026 white). This demonstrates very clearly that the mosaic was genetically a

¹ Zoological Laboratory Contribution No. 191. Indiana University.

garnet white. Professor Morgan writes us that he would also interpret this case on the binucleated egg hypothesis. We see clearly how the hypothesis may be applied and that the binucleated eggs described by Doncaster may give indirect evidence in its favor. Perhaps it is the best interpretation. We wish to point out, however, that there are other possibilities although they may have no direct or indirect morphological or experimental evidence in their favor.

Let us assume the individual started as a normal male, the single X chromosome carrying the genes for garnet and white. Since the mosaic did not carry the gene for yellow, the garnet white genes must have been brought together by a double crossing over in the mother. The only assumption we need to make is that during somatogenesis, the white end of one of the daughter X chromosomes became in some way inactive or lost. This would leave in one cell a whole X chromosome carrying white and garnet; in the other an imperfect X chromosome carrying garnet only. We know by test that white and garnet in the same chromosome give an eye practically indistinguishable from white. If one eye arose from the descendants of one of these two cells and the other eye from the second cell, we could account for the difference in color. The only assumption we need to make then is the loss or inactivation of the white gene in one of the early cleavage cells. On the binucleated egg hypothesis we must assume, first, the presence of two nuclei within the egg; secondly, that each nucleus is fertilized by a Y sperm; and thirdly, that the sex cells of the male arose from the descendants of only one of these nuclei, as all sperm were alike, carrying garnet and white.

A second possibility is that of somatic mutation. If the white gene in one of the cells should mutate to red, we would have a cell whose X chromosome carried the gene for garnet. If the descendants of this cell gave rise to one eye and the descendants of the other cells to the second, we would have one eye garnet and one garnet white, which is white. It is true that white eye has never reverted to red in all the thousands which have been bred. This fact renders this suggestion improbable but not impossible.

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